Labor Market Mismatch

Debra Hevenstone, Emily Murphy, Helen Buchs

Swiss Job Market Monitor, University of Zurich

May 30, 2015
Tilburg, Netherlands

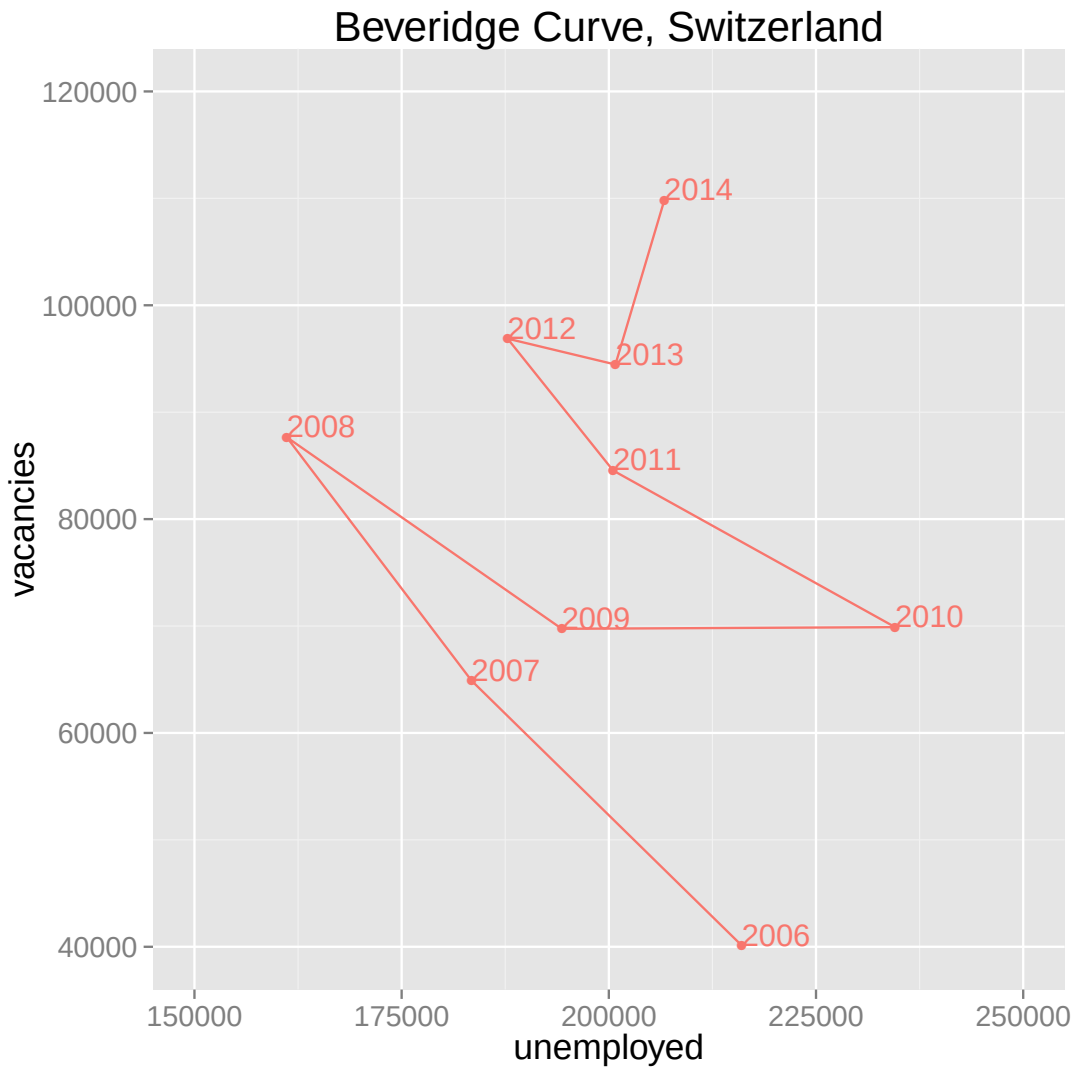
smm stellenmarkt monitor CH

SECO
Staatssekretariat für Wirtschaft
SECO

Outline

- Introduction
- Data
- Methods
- Results
- Conclusion

Introduction: Beveridge Curve, Switzerland



Introduction: Why declining labor market efficiency?

- Unemployment insurance system
- Increasing long term unemployed
- Migration

- *Labor market mismatch*
  - Geographic mismatch

    (more commuting, but less residential mobility)
  - Occupational mismatch

    (significant skills upgrading, but disproportionately among women)
  - Combination mismatch

    (geographic, occupational, education, experience)

Introduction: Limitations of current research

- Limitations
  - Uni-dimensional mismatch despite
    - multiple simultaneous types of mismatch
      (skills, experience, occupation, geography)

(Barnichon & Figura, 2011)

  - Discrete measures despite
    - worker flexibility
      (commuting, residential mobility, occupational mobility)

(Sahin et. al, 2012; Hobijn, 2012; Daniel, 1983; Meadows, 1988)

Introduction: Limitations of current research

- Limitations
  - Uni-dimensional mismatch despite
    - multiple simultaneous types of mismatch
      (skills, experience, occupation, geography)

(Barnichon & Figura, 2011)

  - Discrete measures despite
    - worker flexibility
      (commuting, residential mobility, occupational mobility)

(Sahin et. al, 2012; Hobijn, 2012; Daniel, 1983; Meadows, 1988)

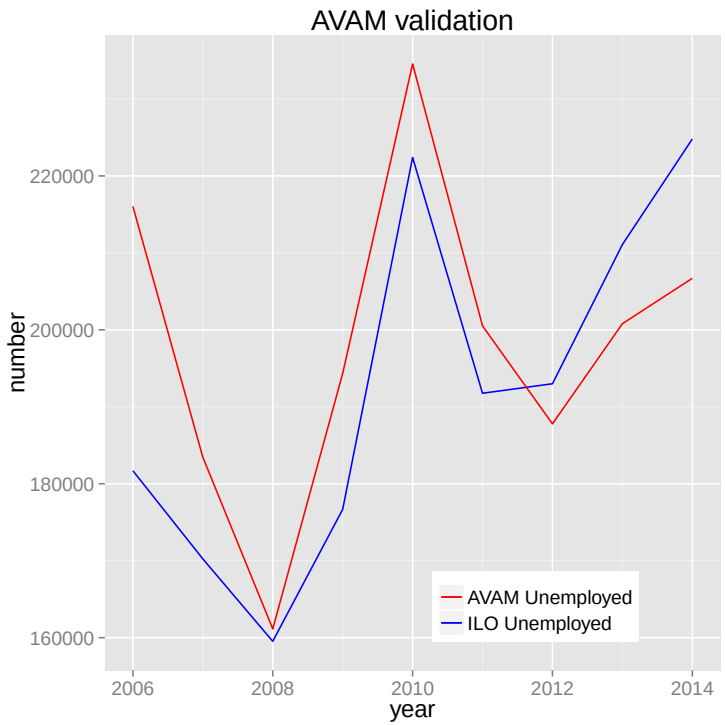
- Innovation
  - Joint mismatch
  - Worker flexibility

Data: Swiss unemployment records (2006-2014)

- Includes detailed individual information

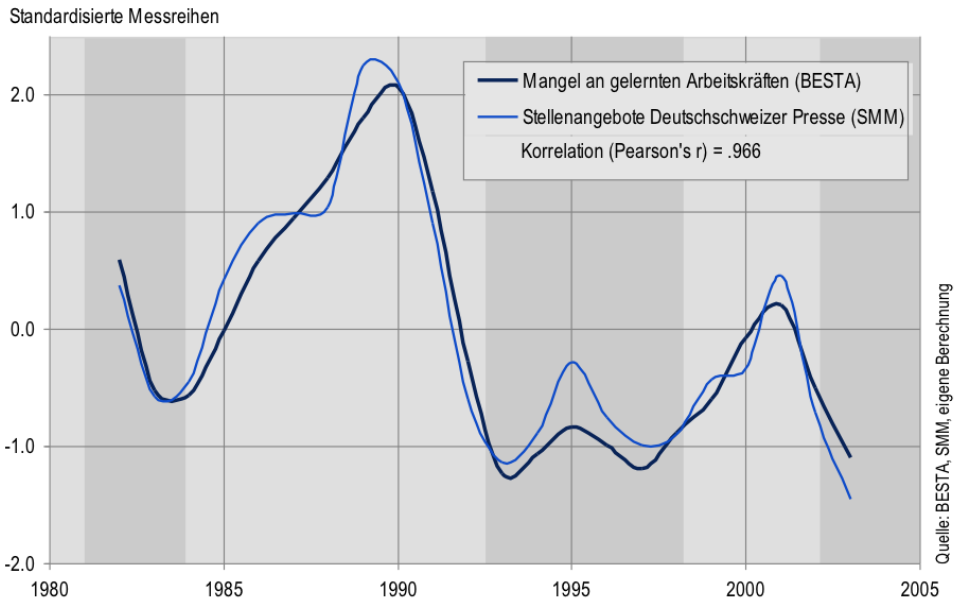
  (occupation, town, education, experience)
- Often *exceeded* ILO count until 2011 revision

  (generous benefits, eligibility for those entering the labor market)



Data: Swiss Job Market Monitor (2006-2014)

- Includes detailed vacancy information
  (occupation, town, education, experience)
- Random sample of jobs advertisements (2-4k per year)
  (press, company websites, online job portals)



(Sacchi & Salvisberg 2011)

Data: Weighting matrices

- Occupational and geographic transitions
  - SAKE (Swiss labor market survey)
  - SHP (Swiss panel data)
- Commuting times
  - Swiss census structural survey
- Distances
  - Google maps / SwissBoundaries

Method: Occupational units

SBN1 (9)	SBN2 (38)	SBN3 (87)	SBN5 (380)
1 agriculture			
2 manufacturing	81 media		
3 technical/inform	82 art	861 medicine	861.01 doctor
4 construction	83 caring	862 therapy	861.02 medical ass.
5 retail	84 education	863 dental	861.03 pharmacist
6 hospitality	85 soc/nat sci	864 veterinary	861.04 pharmacy ass.
7 management	86 health	865 nursing	
8 health/edu/culture	87 sport		
9 other			

Method: Geographic Units

- Labor market regions (16)

- District (148)

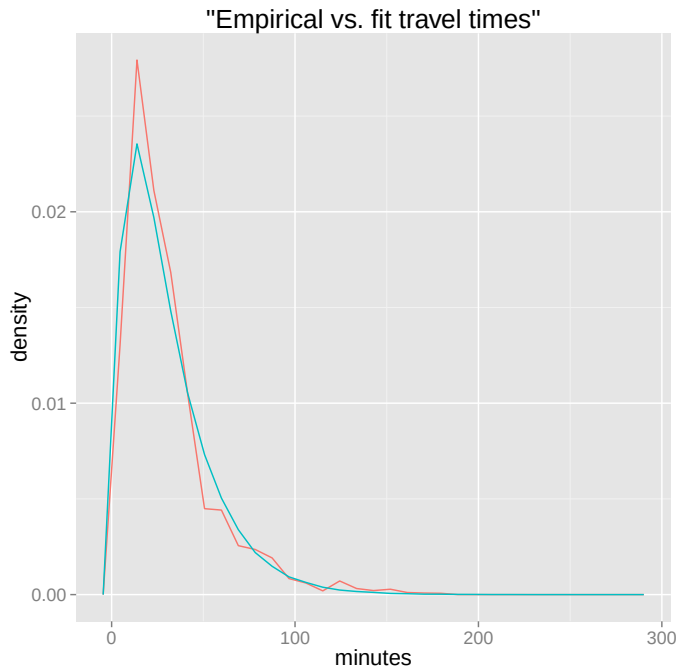
Method: Weighting approaches

- Geographic Weights
  - Discrete: location of residence vs. new job
  - Continuous: probability of commute by distance
- Occupational Weights
  - Discrete: occupation-occupation transitions
  - Continuous: occupation transition by sbn digit change

$$V^* = \begin{pmatrix} & (1,1) & (1,2) & (2,1) & (2,2) \\ (1,1) & .7 & .13 & .13 & .04 \\ (1,2) & \dots & \dots & \dots & \dots \\ (2,1) & \dots & \dots & \dots & \dots \\ (2,2) & \dots & \dots & \dots & \dots \end{pmatrix} \begin{pmatrix} 3 \\ 4 \\ 7 \\ 9 \end{pmatrix} = \begin{pmatrix} 3.89 \\ \dots \\ \dots \\ \dots \end{pmatrix}$$

Method: Continuous geographic weighting

1. Calculate driving distances matrix between all district pairs
2. Fit commute time distribution



gamma	
shape	rate
1.603	0.053

3. Generate matrix of predicted probabilities, row-standardize
4. Matrix $*$ Vacancies $=$ weighted vacancies, & upweight

Method: Indices

- Jackman 1: The proportion of unemployed in the wrong sector

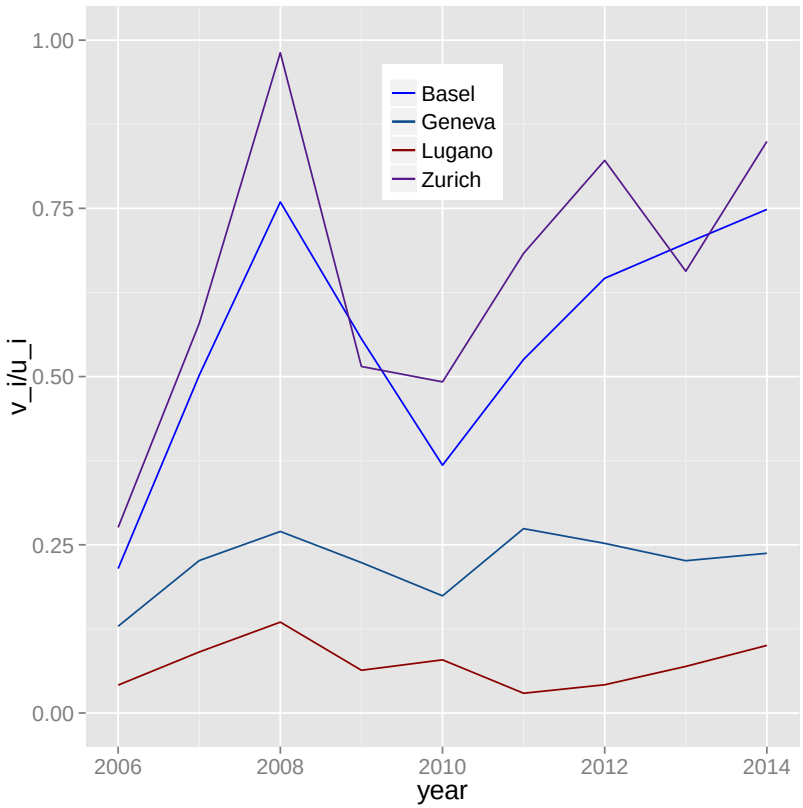
$$\frac{1}{2}\sum_i |\hat{u}_i - \hat{v}_i|$$

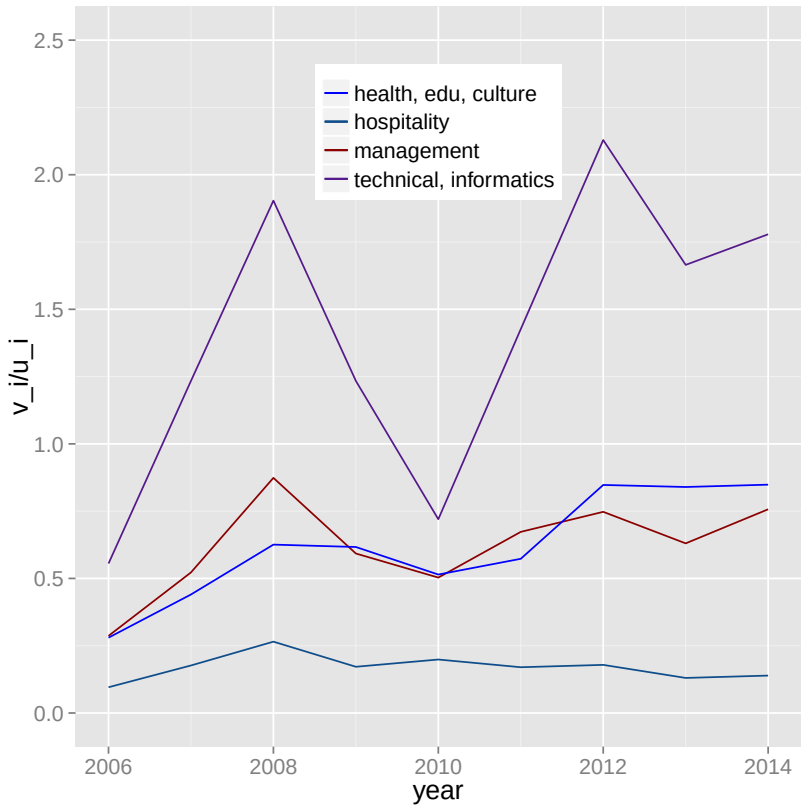
- Jackman 2: The proportion of observed unemployment attributable to structural imbalance

$$1 - \sum_i (\hat{u}_i \hat{v}_i)^{.5}$$

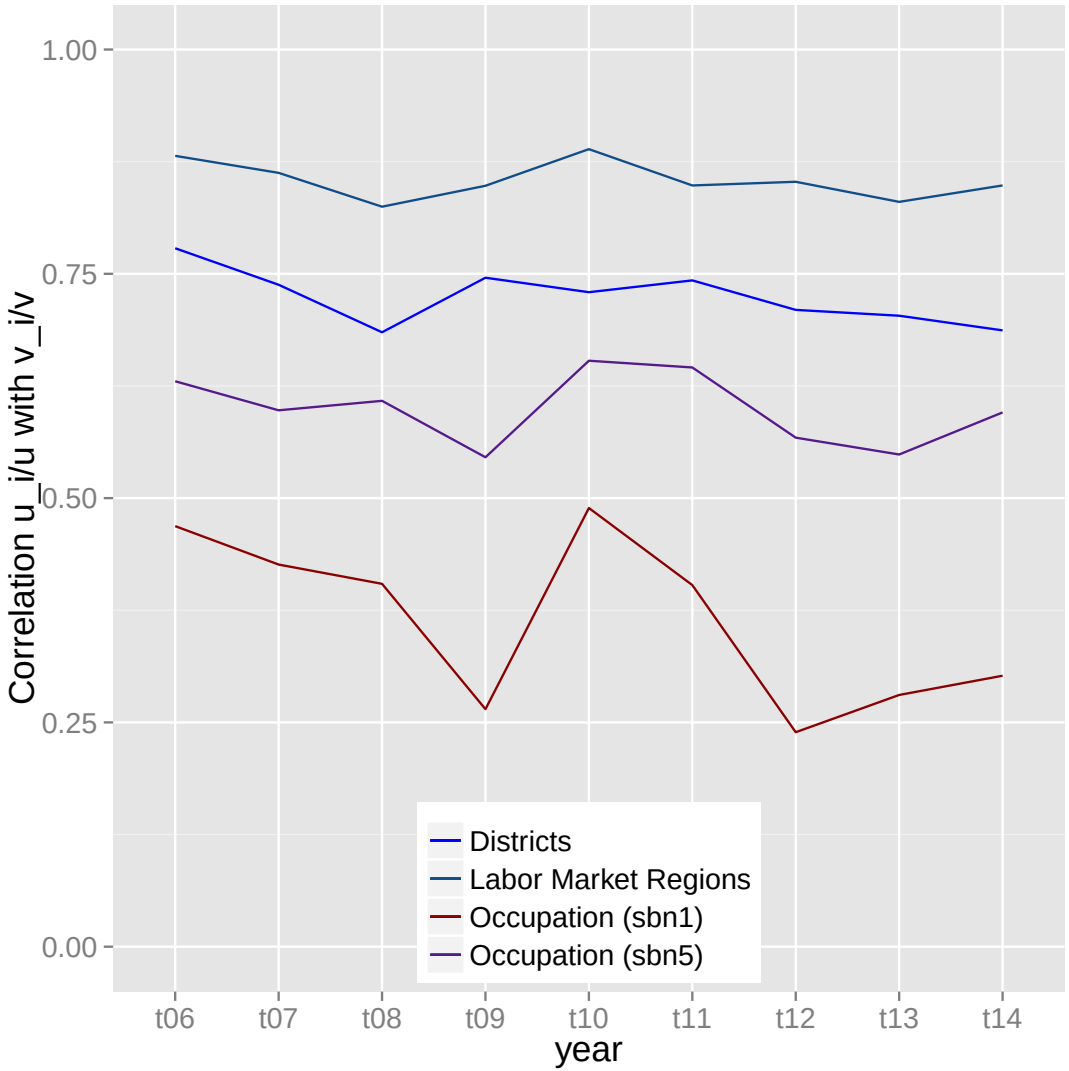
where $\hat{u}_i = \frac{u_i}{u}, \hat{v}_i = \frac{u_i}{u}$

Results: ($\frac{V_i}{U_i}$ ratios)

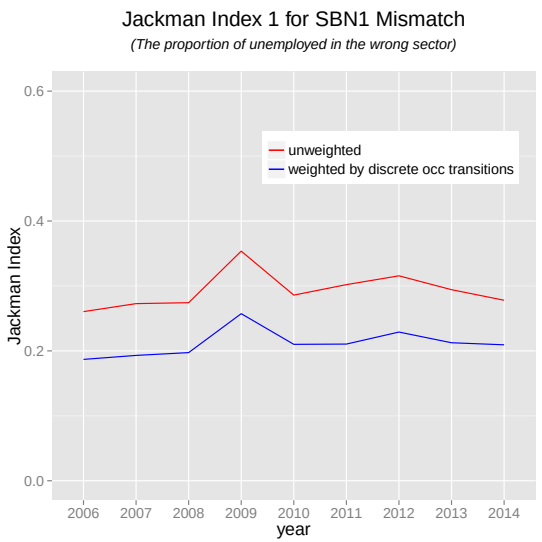


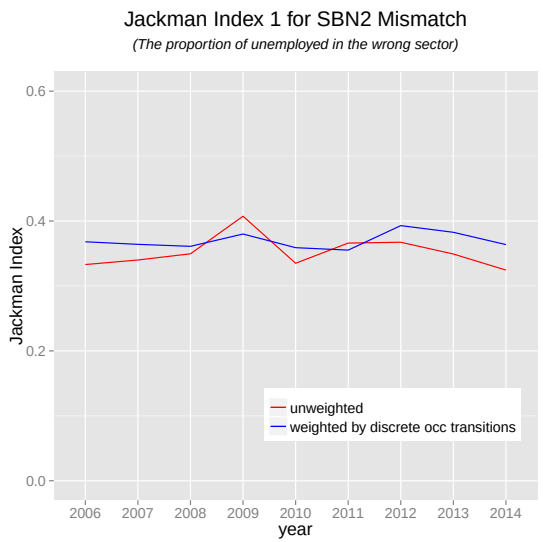


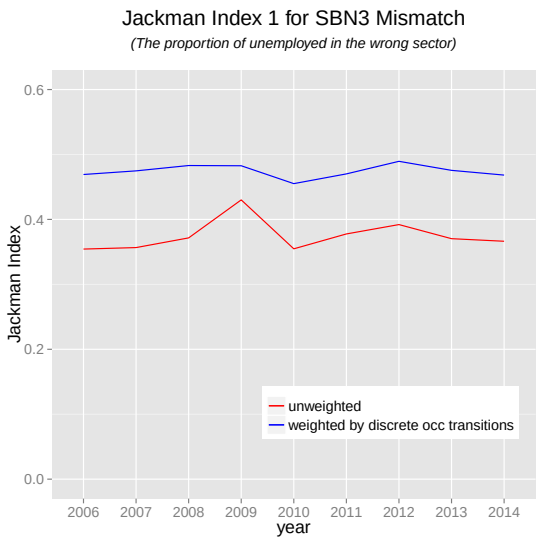
Results: Vacancy and unemployment share correlation

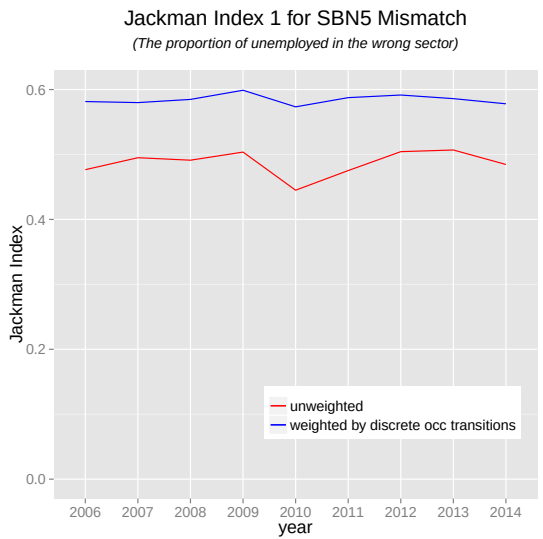


Results: Occupational mismatch weighting

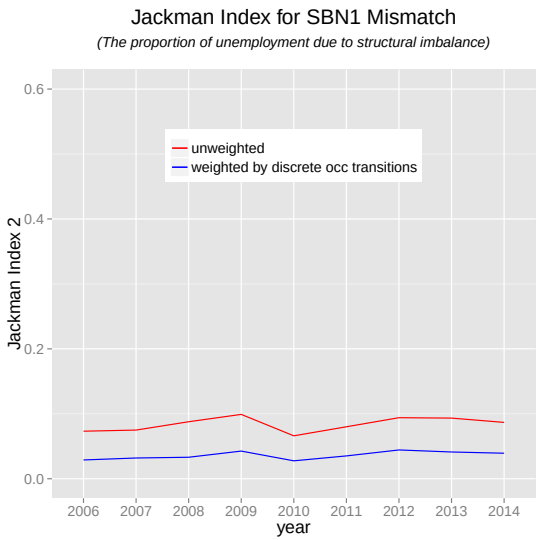


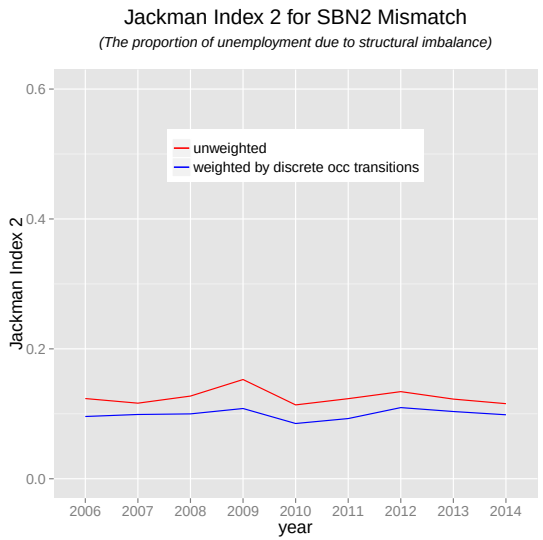


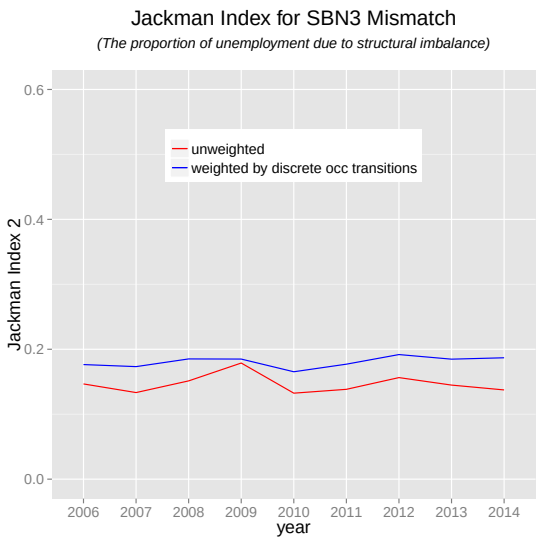


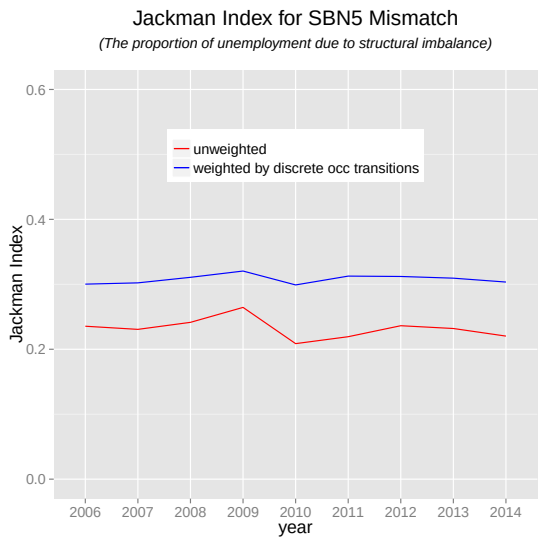


Results: Occupational mismatch weighting









Results: Occupational mismatch weighting effects

	Percent change in occupational mismatch due to weighting			
	2006		2014	
	Jackman 2	Jackman 1	Jackman 2	Jackman 1
SAKE				
sbn1	-60.49%	-28.24%	-54.70%	-24.68%
sbn2	-22.37%	10.53%	-14.80%	12.10%
sbn3	20.34%	32.41%	36.04%	27.81%
sbn5	27.52%	22.02%	37.78%	19.28%
SHP				
sbn1	-68.94%	-28.24%	-62.39%	-24.68%
sbn2	-21.45%	10.07%	-17.32%	10.58%
sbn3	5.97%	27.07%	18.78%	23.04%
sbn5	25.78%	18.60%	31.46%	14.48%

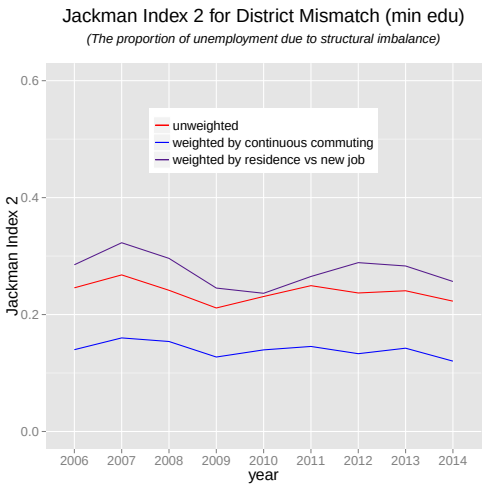
Results: Occupational mismatch weighting summary

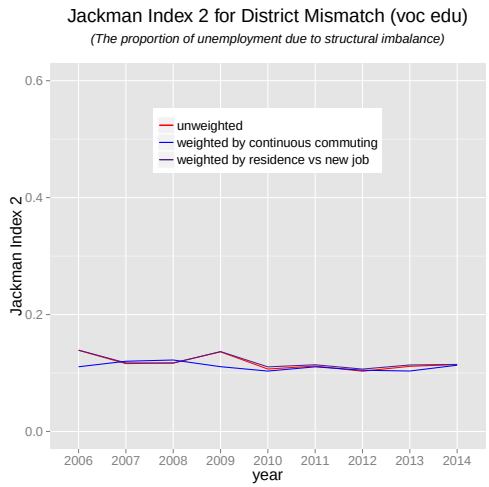
- Big occupational changes decrease mismatch
- Small occupational changes increase mismatch

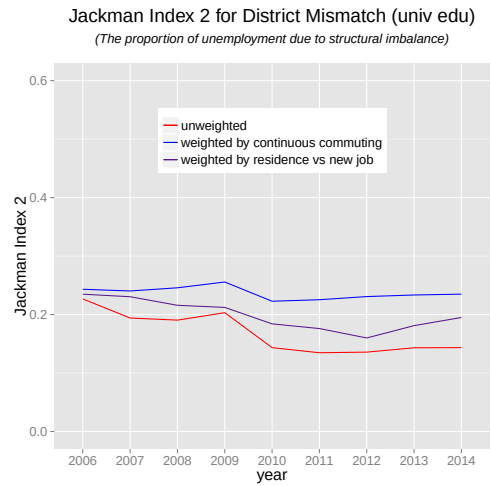
Move Up or Move Out

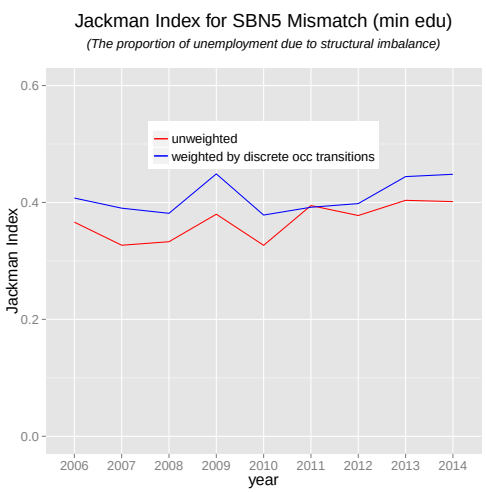
- Occupational mismatch increases with economic cycles
- Occupational change tempers economic cycles

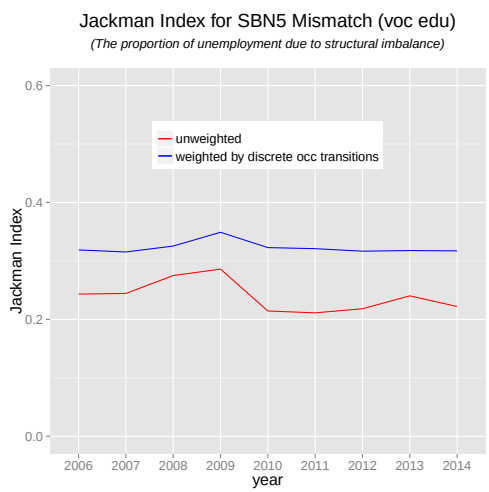
Results: Mismatch within education (Jackman Index 2)

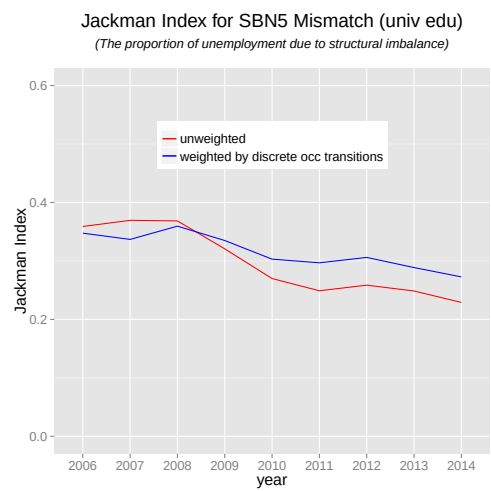












Results: Mismatch within education (Jackman Index 2)

- The least educated suffer the more geographic mismatch
  - However they suffer less considering commuting
- Those with vo-tech have low occupational mismatch
  - However they move towards jobs with fewer vacancies
- The highly educated have decreasing levels of geographic and occupational mismatch
  - However the decline is less steep with weighting

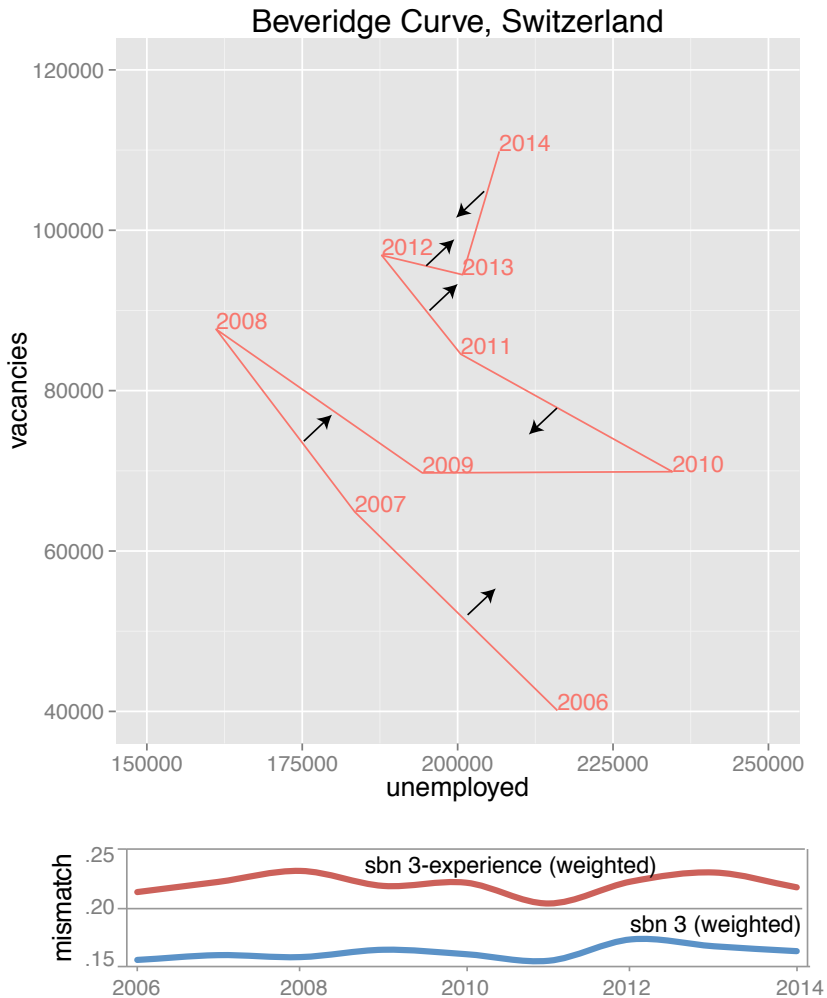
Results: Occupational mismatch overlap (2014)

	Percent increase in occupational mismatch considering education and/or experience		
	unweighted	SHP weight	SAKE weight
sbn1	0.087	0.033	0.039
+ edu	35.65%	176.75%	153.58%
+ experience	66.29%	135.06%	137.80%
+edu & exp	115.00%	422.52%	318.06%
sbn2	0.116	0.096	0.098
+ edu	33.50%	75.64%	66.29%
+ experience	56.90%	42.32%	55.30%
+edu & exp	99.38%	201.79%	160.37%
sbn3	0.137	0.163	0.187
+ edu	37.48%	43.78%	34.11%
+ experience	49.68%	18.40%	20.67%
+edu & exp	91.86%	95.94%	60.23%
sbn5	0.220	0.290	0.303
+ edu	33.57%	31.79%	25.29%
+ experience	33.09%	10.42%	14.00%
+edu & exp	70.30%	45.86%	39.14%

Results: Occupational mismatch overlap

- Considering education and experience requirements exacerbates mismatch
- Surprisingly compound effects are about equal to the sum of individual effects

Results: Back to the Beveridge Curve



- SBN 3 mismatch explain trends
- Most measures suggest
  - increasing mismatch during the recession
  - decreasing mismatch thereafter
- Alternative explanations needed post-2012

Conclusion

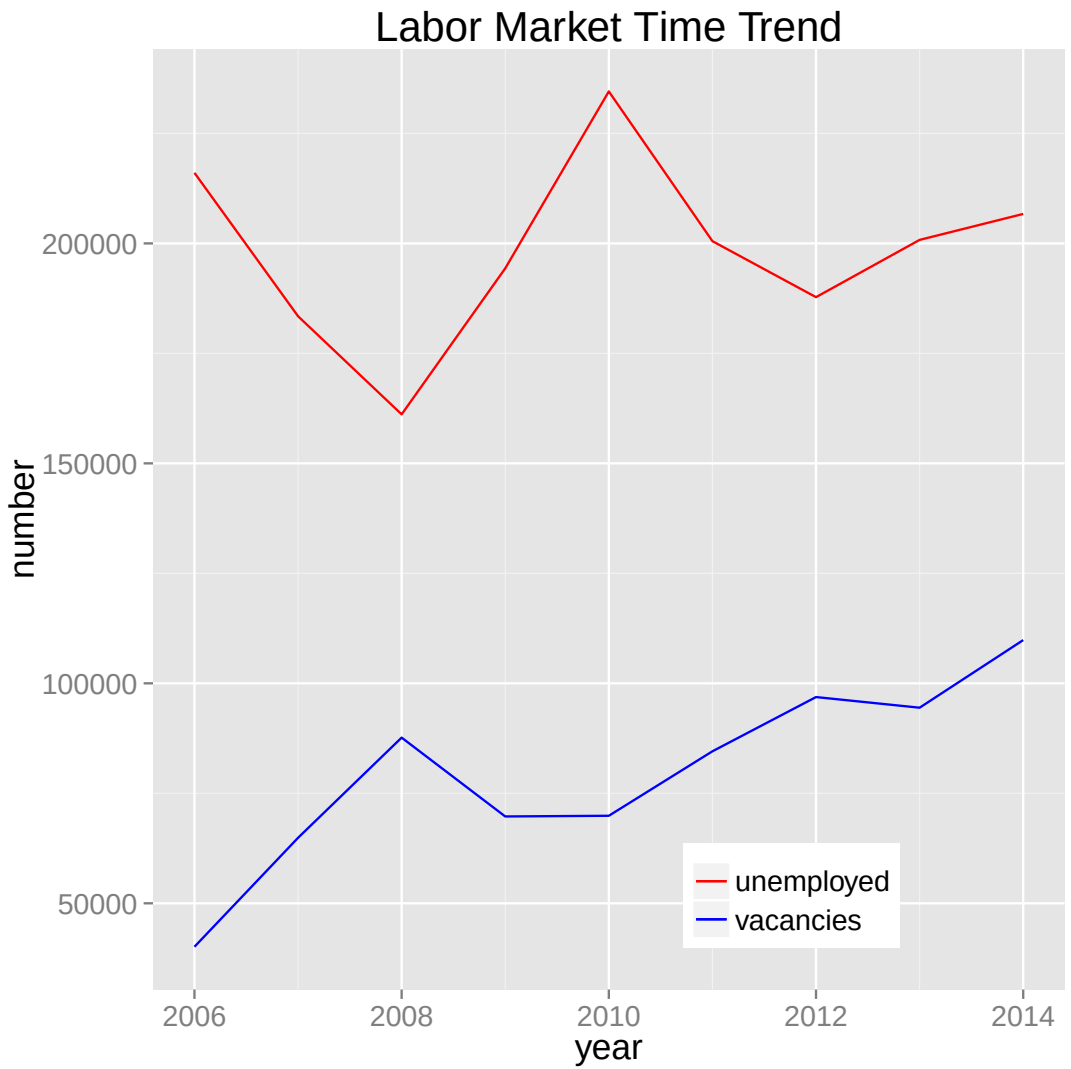
- Growing labor market inefficiency
  - can be explained by mismatch during the Great Recession
  - cannot be explained by mismatch after the Great Recession
- Occupational shifts
  - big ones improve mismatch
  - small ones exacerbate mismatch
- Educational groups
  - low-skill: more geographic mismatch ignoring commuting
  - mid-skill: less mismatch, but occupational moves increase it
  - high-skilled: low & decreasing levels of mismatch

Future Work

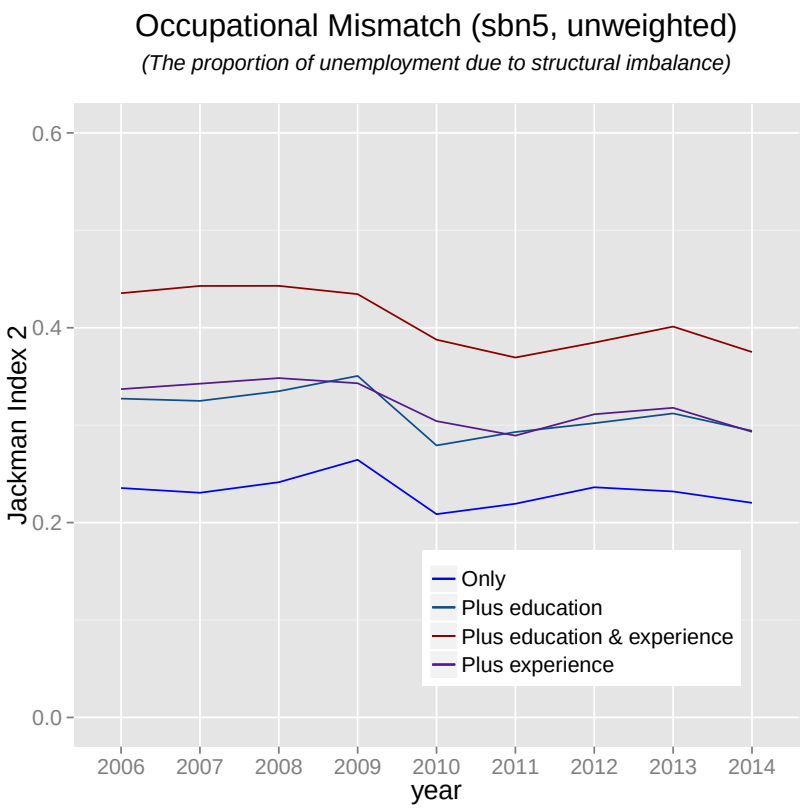
- Continuous occupational mismatch weighting
- Indices considering sector size
- Hazard analysis of unemployment duration considering $\frac{v_i}{u_i}$

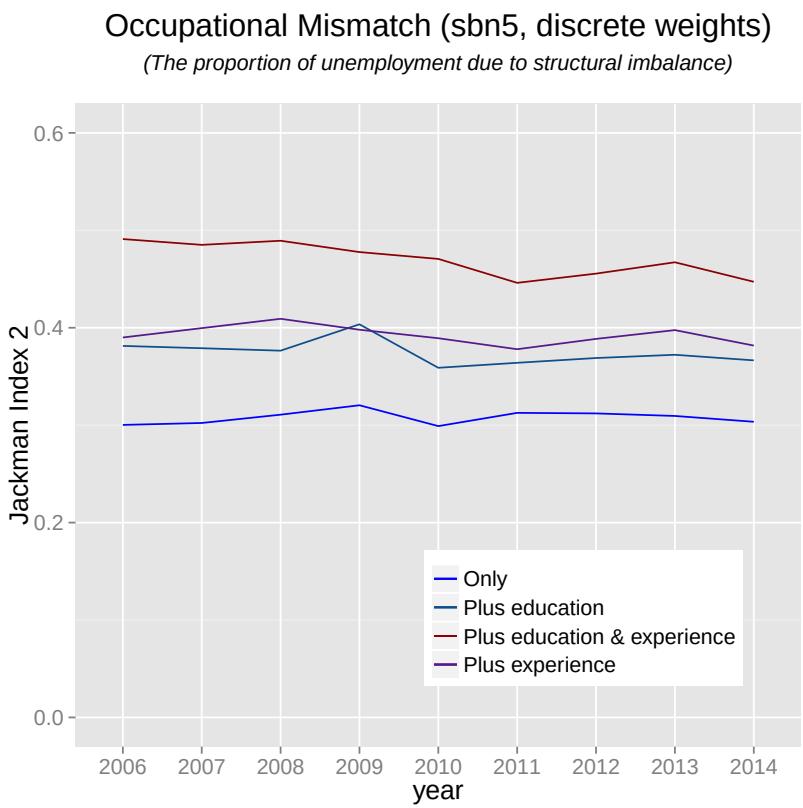
Thank You

Appendix: Vacancy and unemployment trends



Appendix: Occupational mismatch overlap





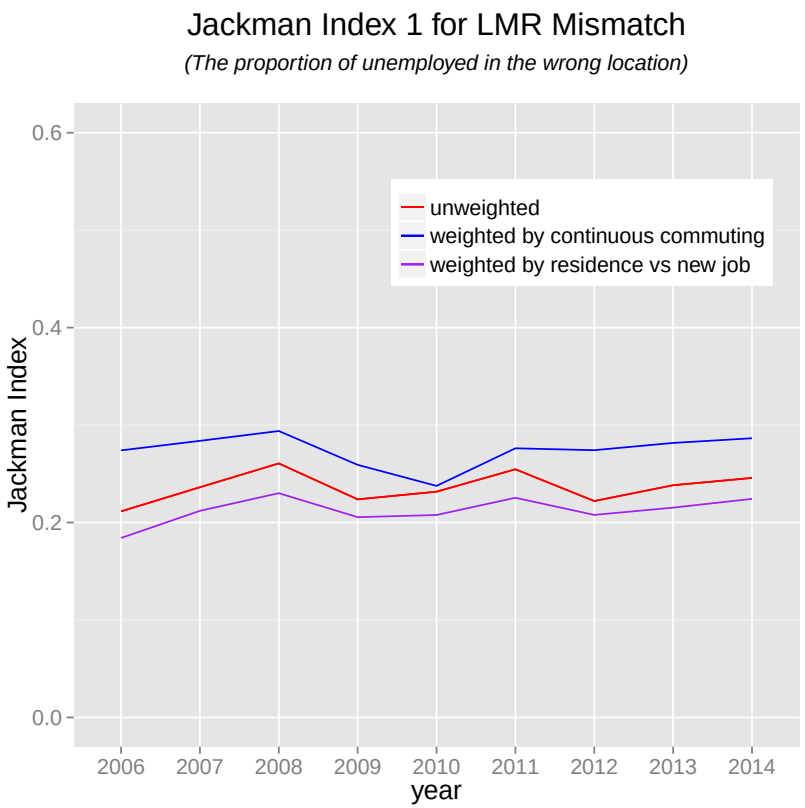
Appendix: Occupational mismatch overlap (2006)

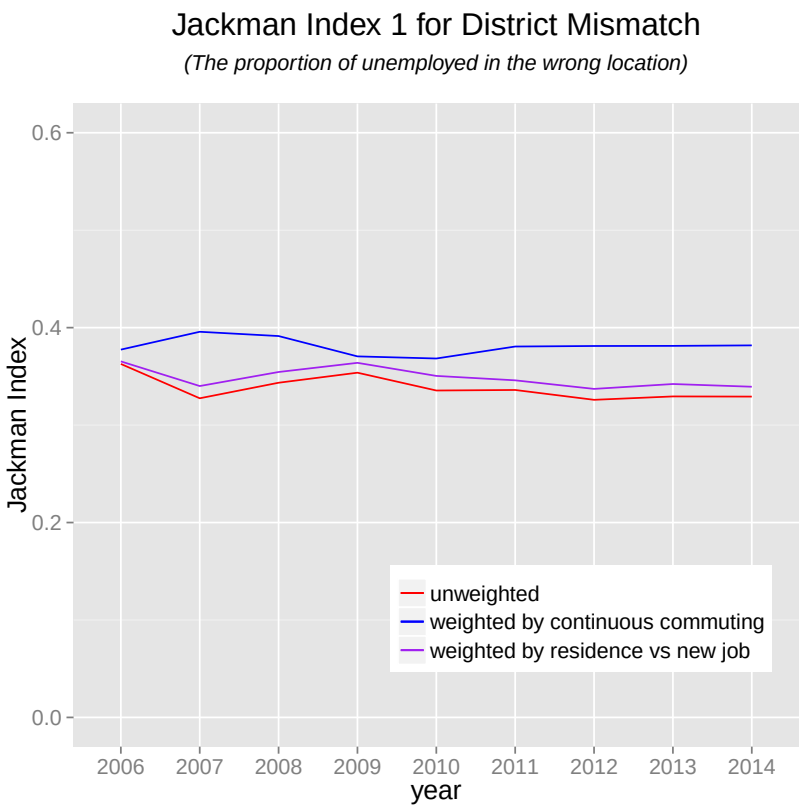
Percent increase in occupational mismatch considering education and/or experience

	unweighted	SHP weight	SAKE weight
sbn1	0.073	0.023	0.029
+ edu	84.08%	300.03%	303.47%
+ experience	96.62%	177.84%	205.98%
+edu & exp	190.64%	661.55%	576.96%
sbn2	0.123	0.097	0.096
+ edu	52.76%	96.43%	87.53%
+ experience	63.83%	51.07%	77.50%
+edu & exp	127.31%	242.44%	198.88%
sbn3	0.147	0.155	0.176
+ edu	52.06%	60.64%	47.16%
+ experience	60.90%	24.67%	32.41%
+edu & exp	121.42%	132.07%	91.36%
sbn5	0.235	0.296	0.300
+ edu	38.99%	36.29%	31.13%
+ experience	43.12%	13.98%	19.93%
+edu & exp	84.93%	58.24%	56.81%

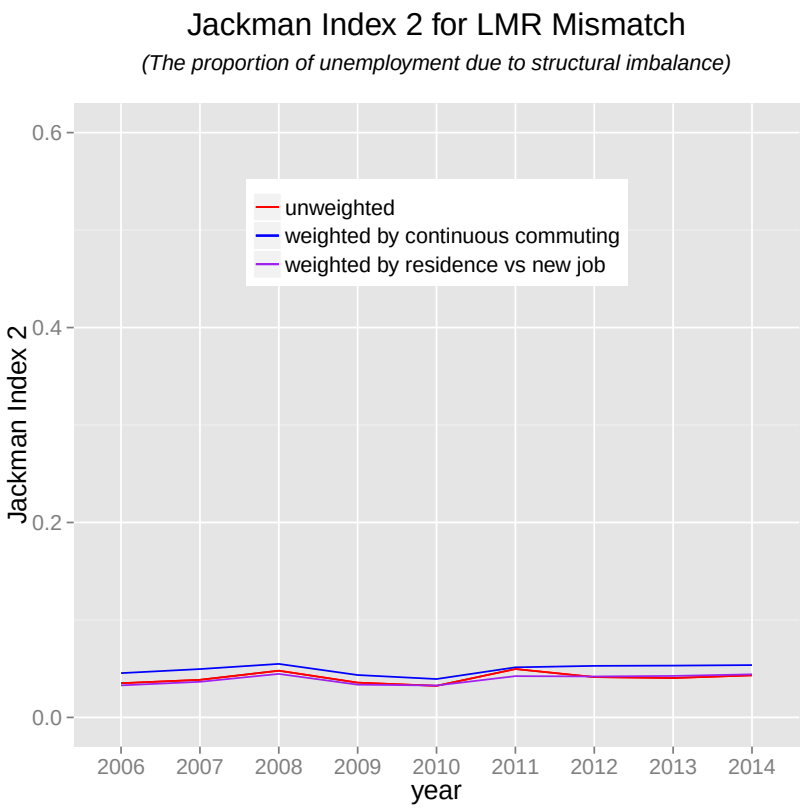
(Jackman 2)

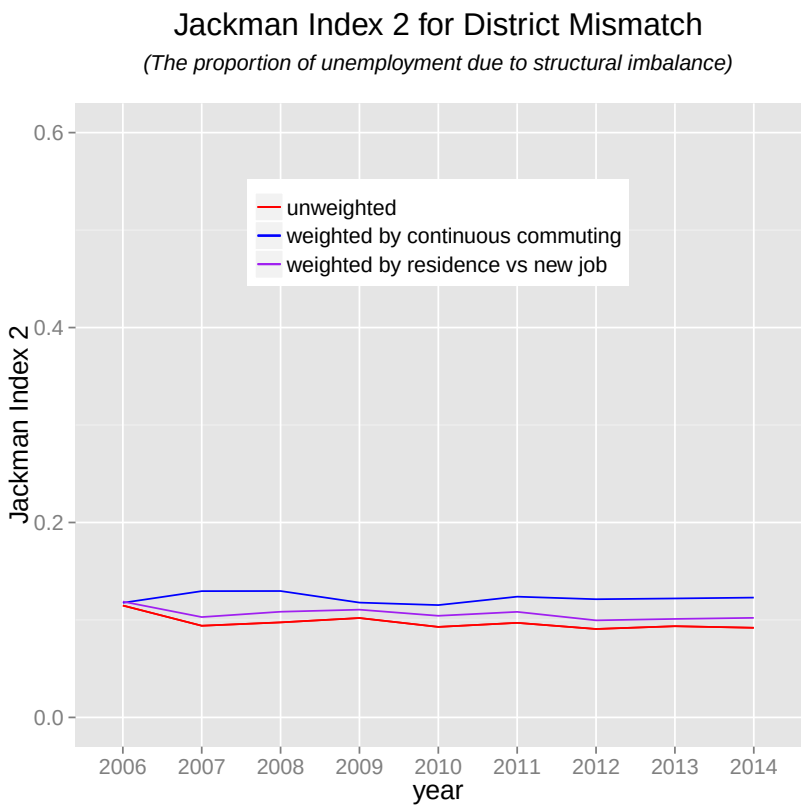
Results: Geographic Mismatch (Jackman Index 1)





Appendix: Geographic mismatch (Jackman Index 2)

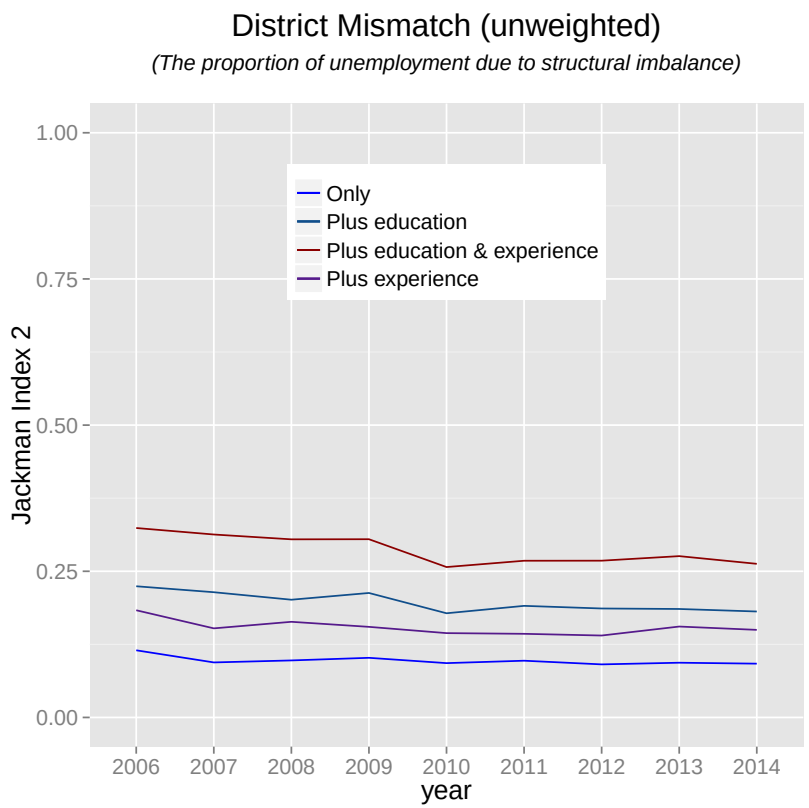


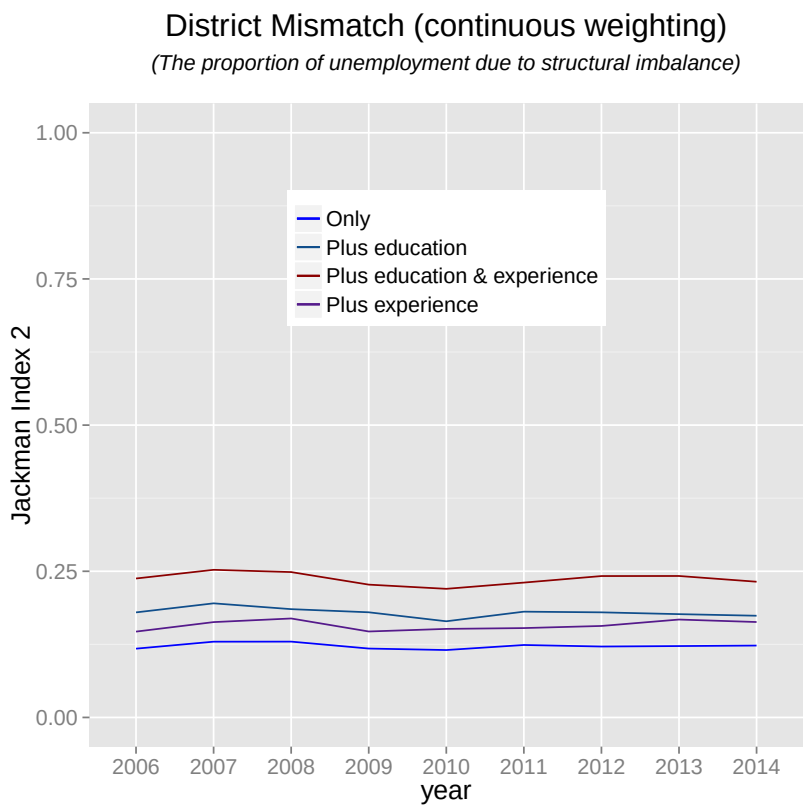


Appendix: Geographic mismatch weighting effects

	Percent change in geographic mismatch due to weighting			
	2006		2014	
	Jackman 2	Jackman 1	Jackman 2	Jackman 1
continuous				
Bezirk	2.44%	4.05%	33.67%	15.97%
AMR	29.51%	29.60%	24.33%	16.56%
discrete				
Bezirk	3.52%	3.52%	11.09%	3.07%
AMR	-6.32%	-6.32%	2.39%	-8.75%

Results: Geographic mismatch overlap





Appendix: Geographic mismatch overlap (2006)

	Percent increase in mismatch considering education and experience		
	unweighted	continuous weight	discrete weight
Labor Market Region	0.035	0.045	0.033
+ edu	170.01%	124.88%	232.93%
+ experience	106.64%	68.37%	123.10%
+edu & exp	365.77%	256.65%	460.03%
District	0.115	0.118	0.119
+ edu	95.42%	51.89%	106.79%
+ experience	59.67%	22.86%	58.98%
+edu & exp	182.18%	97.22%	188.51%

(Jackman 2)

Appendix: Geographic mismatch overlap (2014)

	Percent increase in mismatch considering education and experience		
	unweighted	continuous weight	discrete weight
Labor Market Region	0.043	0.054	0.044
+ edu	112.19%	87.84%	144.75%
+ experience	99.87%	77.46%	107.83%
+edu & exp	257.91%	200.80%	283.76%
District	0.092	0.122	0.102
+ edu	97.02%	43.75%	102.53%
+ experience	62.86%	30.26%	58.03%
+edu & exp	185.65%	88.96%	171.29%

(Jackman 2)

Appendix: Geographic mismatch overlap

- Regional mismatch increased slightly during the Great Recession and 2011
- District mismatch has been stable
- Overall stability
- Continuous weights increase mismatch
- Considering education & experience increases mismatch

Appendix: Geographic mismatch

- Mismatch increases using geographic weights
- Continuous commuting weights have a greater effect